

REMARKS

Reconsideration of the rejections set forth in the Official Action is respectfully requested in view of the above amendments and the following remarks.

Restriction Requirement

Applicants affirm their election with traverse of the subject matter recited in Claims 1-12 and 15-23 and also note that Claims 13, 14, and 24-31 have been withdrawn from consideration. Upon allowance of the claims, rejoinder of the non-elected claims is respectfully requested.

Rejections Under 35 U.S.C. §103

1. Claims 1-4, 6-9, 11, 12, 15, 16, 18-20, 22 and 23 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,676,805 to Tamura. The reasons for the rejection are stated on pages 2-10 of the Official Action. The rejection is respectfully traversed.

Regarding Claim 1, the Official Action alleges that Tamura discloses a substrate support comprising a ceramic member, a metallic heat transfer member overlying a ceramic member, and an electrostatic chuck having a support surface, but acknowledges that Tamura does not expressly disclose the heat transfer member having specific dimensions, or specific heat exchange rate.

The Official Action further alleges that:

"At the time of invention it would have been obvious to one of ordinary skill in the art form the heat transfer member of Tamura with the thickness of $\frac{1}{4}$ inch or $\frac{1}{8}$ inch to provide a heat transfer member with a low thermal mass to quicken the change in temperature of the heat transfer member given the same liquid flow rate. The only difference between the prior art and the claims is a recitation of relative dimension of the claimed device and the device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device is not patentably distinct from the prior art device".

differently than the prior art device, the claimed device is not patentably distinct from the prior art device".

As explained in the specification, the rate at which a body can be heated or cooled is related to the body's heat capacity or thermal mass "C" and because the thermal mass equals the mass of a body "m" times its specific heat capacity "c" the thermal mass of a body can be changed by changing its mass, i.e., changing a body's volume (see paragraph 0017). To change a body's temperature by an amount ΔT , the amount of heat to be added or removed from a body is a function of a body's thermal mass, i.e., as thermal mass increases the amount of heat to be added or removed also increases (paragraph 00017). Thus, a substrate support with a large thermal mass cannot change temperature as quickly as a substrate support with a small thermal mass (paragraph 0019). The claimed substrate support provides an improvement over conventional substrate supports by providing a novel substrate support which achieves rapid heating or cooling to a degree previously unavailable.

Rejections under 35 USC §103 must be based on "evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness" *In re Lee*, 277 F3d 1338, 61 USPQ2d 1430, 1434 (Fed. Cir. 2002). A showing of a suggestion, teaching , or motivation to combine the prior art references is an essential component of an obviousness holding and "particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed." (Emphasis Added). *Id.*

Moreover, “the Examiner must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination.” *Id.* Conclusory statements regarding what is “basic knowledge” and “common sense” cannot be used to cure deficiencies of the cited references.

To avoid an impermissible hindsight reconstruction of the prior art, it is necessary “to consider the thinking of one of ordinary skill in the art at the time of the invention and guided only by the prior art references and then-accepted wisdom in the field” (Emphasis Added). *In re Kotzab*, F3d, 55 USPQ2d 1313, 1316 (Fed. Cir. 2000). The motivation, suggestion or teaching to modify the primary reference “may come explicitly from statements in the prior art, the knowledge of one of ordinary skill in the art, or, in some cases the nature of the problem to be solved.” *Kotzab*, 55 USPQ2d at 1317. However, while the teaching, motivation or suggestion may be implicit from the prior art as a whole, rather than expressly stated in the references, the test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. *Id.* If the Examiner relies on an express or implicit showing, the Examiner must provide particular findings related thereto. *Id.* Conclusory statements are not evidence. In *Kotzab*, the court reversed a Board of Patent Appeals decision because “there was no finding as to the specific understanding or principle within the knowledge of a skilled artisan that would have motivated one with no knowledge of Kotzab’s invention to make the combination in the manner claimed.” *Kotzab*, 55 USPQ2d at 1318.

Section 103 of 35 U.S.C. requires consideration of the claimed invention "as a whole." *Ruiz v. A.B. Chance Co.*, 69 USPQ2d 1686, 1690 (Fed. Cir. 2004). As set forth in this case:

The 'as a whole' instruction in title 35 prevents evaluation of the invention part by part. Without this important requirement, an obviousness assessment might break an invention into its component parts (A + B + C), then find a prior art reference containing A, another containing B, and another containing C, and on that basis alone declare the invention obvious. This form of hindsight reasoning, using the invention as a roadmap to find its prior art components, would discount the value of combining various existing features or principles in a new way to achieve a new result - often the very definition of invention. *Id.*

The discovery of a source of a problem is part of the "subject matter as a whole" inquiry of 35 U.S.C. § 103. *In re Sponnoble*, 160 USPQ 237, 243 (CCPA 1969); MPEP § 2141.02(III). The discovery of the source of a problem can provide the basis of a patentable invention even though the remedy for the problem may be obvious once the source is identified. *Sponnoble*, 160 USPQ at 243. As set forth in *In re Shaffer*, 108 USPQ 326, 329 (CCPA 1956):

In fact, a person having the references before him who was not cognizant of appellant's disclosure would not be informed that the problem faced by appellant ever existed. Therefore, can it be said that these references which never recognized appellant's problem would have suggested its solution? We think not, and therefore feel that the references were improperly combined since there is no suggestion in either of the references that they can be combined to produce appellant's result. (Emphasis added).

In *In re Rinehart*, 189 USPQ 143, 148-49 (CCPA 1976), the court reversed the Board's finding of obviousness because the applied art failed to recognize, and thus did not suggest a solution to, the particular problem encountered by the inventor in scaling up a process disclosed by one of the applied references.

As set forth in *In re Rouffet*, 47 USPQ2d 1453, 1457-58 (Fed. Cir 1998):

To prevent use of hindsight based on the invention to defeat patentability of the invention, this court requires the examiner to show a motivation to combine the references that create the case of obviousness. In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed. (Emphasis added).

In *Rouffet*, the court found that the Board failed to rely on the nature of the problem to be solved, the teachings of the prior art, or the knowledge of persons of ordinary skill in the art as a source of motivation to combine prior art references applied in a rejection under 35 U.S.C. § 103, and reversed the rejection. *Id.* at 1458.

The mere fact that a reference may be modified does not make the resultant modification obvious unless the art suggested the desirability of the modification. *In re Fritch*, 23 USPQ2d 1780, 1783-84, n. 14 (Fed. Cir. 1992); *In re Gordon*, 221 USPQ 1125, 1127 (Fed. Cir. 1984); *Kotzab*, 55 USPQ2d at 1316-17; MPEP § 2143.01(l).

In the final rejection, it is alleged that "The prima facie case of obviousness is established by the knowledge generally available to one of ordinary skill in the art" and in response to Applicant's request that the Examiner cite a prior art reference in support of Examiner's contention, the Examiner cites Johnsgard (US 2002/0047004) as prior art supporting the contention that those skilled in the art would have been motivated to design a thin heat transfer member with a low thermal mass to quicken the change in temperature of the heat transfer member. The Examiner alleges that "Johnsgard teaches rapids thermal processing (RTP) using thin heating lamps with low thermal mass" (¶ 5). However, Johnsgard relates to thermal processing of wafers and states that the temperature non-uniformity problem with such lamp heating can be overcome using heater block 516 having "a large thermal mass"

(paragraphs 0001-0054). Moreover, the substrate support recited in Claim 1 is useful in a plasma reaction chamber whereas the term "plasma" does not appear in Johnsgard. Accordingly, while Johnsgard is non-analogous prior art which does not relate to plasma processing, the large thermal mass wafer support disclosed therein teaches away from the claimed substrate support.

The substrate support recited in Claim 1 includes a metallic heat transfer member having at least one flow passage through which liquid is circulated for heating and/or cooling the member and an electrostatic chuck which supports a substrate in a reaction chamber of a plasma processing apparatus overlies the member. Thus, rapid heating and/or cooling of the substrate can be achieved. As explained in commonly-assigned U.S. Publication 2005/0211385, some plasma etching processes are far more temperature sensitive than others and it is desirable to alter the wafer temperature step-by-step within an etch recipe (paragraph 0040) with rate of temperature change on the order of 0.3°C per second and preferably at 1°C/sec or faster (paragraph 0043). The substrate support recited in Claim 1 allows the possibility of reaching such heating/cooling rates and Claim 15 specifically recites that the heat transfer member can be heated/cooled with circulating liquid at a rate of 0.25-2°C/sec. Tamura is silent regarding the features recited in Claims 1 and 15 and non-analogous Johnsgard actually teaches away from the claimed subject matter.

Therefore, for at least the reasons cited above, withdrawal of this ground of rejection is respectfully requested.

Claim 15 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Tamura. The reasons for the rejection are stated on pages 5 and 6 of the Official Action. The rejection is respectfully traversed.

Claim 15 recites:

"A substrate support useful in a plasma processing apparatus, comprising: a source of temperature controlled liquid; a ceramic member; a metallic heat transfer member overlying the ceramic member, the heat transfer member including at least one flow passage in fluid communication with the liquid source and through which the liquid can be circulated to heat and/or cool the heat transfer member at a rate of from about 0.25-2 °C./sec; and an electrostatic chuck overlying the heat transfer member, the electrostatic chuck having a support surface for supporting a substrate in a reaction chamber of a plasma processing apparatus".

As explained above, Tamura is silent regarding the claimed heating/cooling rate and non-analogous Johnsgard teaches away from the claimed subject matter. Thus, there is no teaching or suggestion in the prior art to modify Tamura in a manner which would result in the claimed subject matter. Moreover, secondary considerations weigh in favor of patentability over Tamura since the combination of features recited in Claim 15 provides a substantial improvement in the substrate support art by achieving a heating/cooling rate recognized as desirable by commonly-assigned U.S. Publication 2005/0211385. As such, withdrawal of the rejection is respectfully requested.

Claims 10 and 21 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Tamura in view of Kanno (U.S. 6,373,681). The reasons for the rejection are stated on pages 6 and 7 of the Official Action. The rejection is respectfully traversed. Dependent Claims 10 and 21 are patentable over Tamura in view of Kanno for at least the same reasons as those discussed above regarding Claims 1 and 15.

Claims 17 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Tamura in view of Yang (U.S. 6,635,580). The reasons for the rejection are stated on pages 8 and 9 of the Official Action. The rejection is respectfully traversed.

Dependent Claim 17 is patentable over Tamura in view of Yang for at least the same reasons as those discussed above regarding Claim 15.

Dependent Claims 2-4, 6-9, 11, 12, 16, 18-20, 22 and 23 are patentable over U.S. Patent No. 6,676,805 to Tamura for at least the same reasons as those discussed above regarding Claims 1 and 15.

In summary, the Official Action has failed to establish a *prima facie* case of obviousness regarding the subject matter recited in Claims 1-12 and 15-23. See MPEP § 2143. Therefore, Claims 1-12 and 15-23 are patentable.

Conclusion

For the foregoing reasons, allowance of the application is earnestly solicited.

Should the Examiner feel that any issues remain, it is requested that the undersigned be contacted at the number given below.

Respectfully submitted,

BUCHANAN INGERSOLL PC

Date: June 26, 2006

By: Peter K. Skiff
Peter K. Skiff
Registration No. 31,917

P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620